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# BLACKSTONE RIVER CORRIDOR STUDY

# CONSERVATION OPTIONS

This DRAFT report was cooperatively prepared by the National Park Service and the Rhode Island and Massachusetts Departments of Envrionmental Management. The findings and recommendations in this DRAFT do not reflect official positions of the National Park Service or the Department of the Interior.

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT MASSACHUSETTS 1898

U.S. DEPARTMENT OF THE INTERIOR

March 3, 1849

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# BLACKSTONE RIVER CORRIDOR STUDY: CONSERVATION OPTIONS

DRAFT

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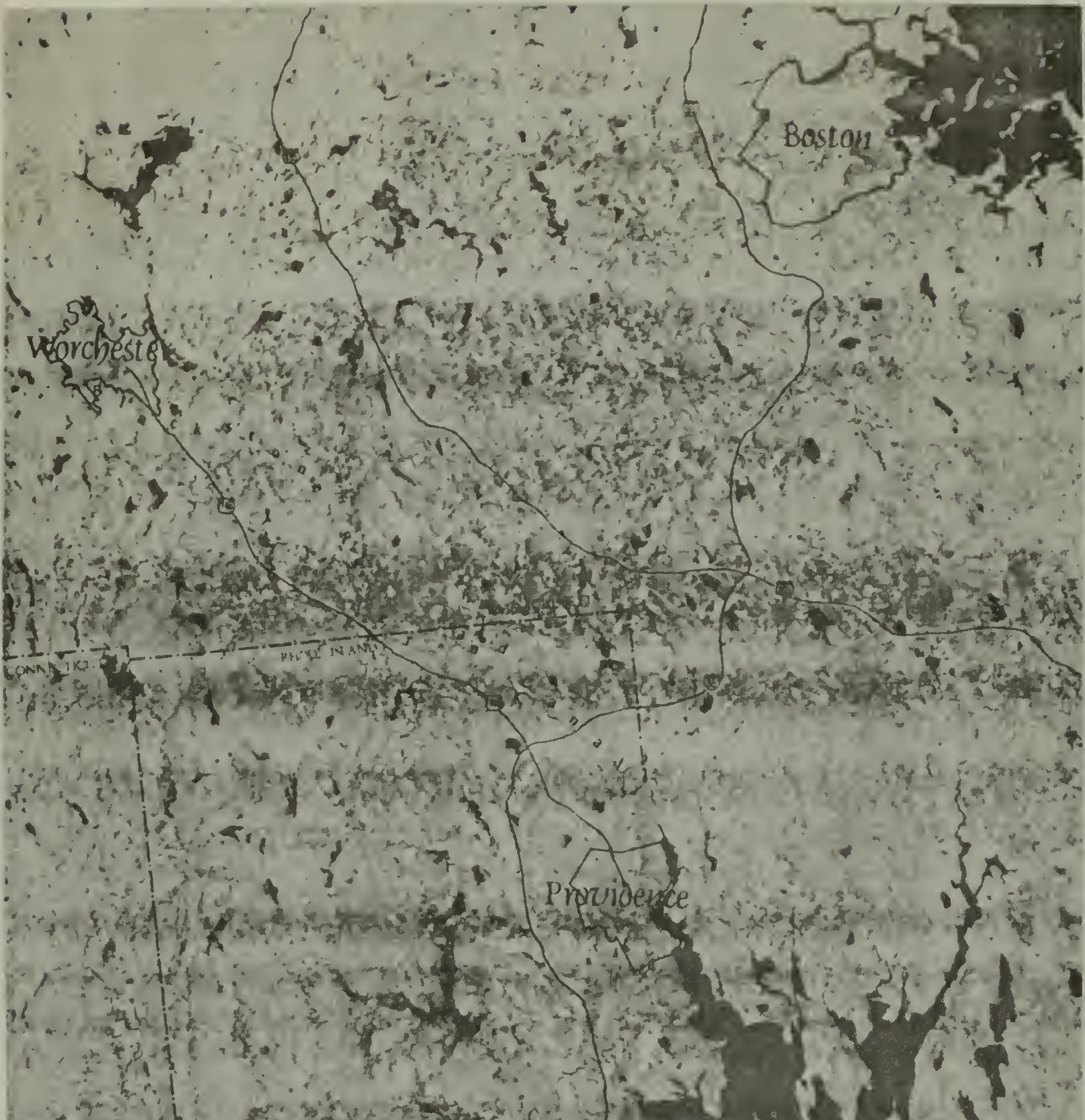

Boston
Worcheste
Providence

# INTRODUCTION AND SUMMARY

## A. Study Background

The Blackstone River Valley is rich in history, natural beauty and cultural traditions. More than one-half century of decline and neglect of these resources is now being reversed as public and private groups work to upgrade the valley both economically and environmentally.

In September 1983, backed by the Massachusetts and Rhode Island delegations, the U.S. Congress asked the National Park Service (NPS) to assist the two states with their efforts to develop a linear park system along the Blackstone River from Worcester to Providence. NPS technical assistance was to include interpretive planning, historic preservation and canal restoration. NPS was also instructed to assess whether the Blackstone corridor might be eligible for inclusion in the National Park System and to explore ideas for cooperative conservation efforts.

The tasks conducted for this report included collection of land use data from published sources and a survey of public attitudes. The survey focused on gaining an understanding of the kinds of people who live in the valley, and, in particular, their attitudes towards natural and cultural resources and their ideas of how conservation of these resources should relate to the overall process of economic revitalization. Approximately 60 people were interviewed, representing a cross-section of interests including economic development, environmental protection, historic preservation and town planning.

## B. Public Attitudes About the Valley and its Resources

In the Blackstone Valley, there is one subject on which everyone agrees: the need for economic revitalization. Until recently, most economic development efforts were concentrated on encouraging new businesses to fill the region's vacant industrial space and on improving highway access to the valley. However, the prospect of a linear park system along the river and canal has sparked new ideas for economic improvement. There is now considerable interest in developing a base for tourism.

Most residents do not perceive the valley as an attractive region or as a significant, interstate resource. The visible effects of economic decline, abandoned mill buildings, derelict industrial lands and pollution of the Blackstone River are some of the most important factors in this lack of local pride.

This negative self-image is reflected in various ways. Little attention has been paid to long-term protection of the river and canal corridor for public enjoyment. Current zoning regulations along the river are inconsistent, often allowing uses incompatible with the development of a linear park. In addition, few local plans address the need to protect town and village centers or the distinctive rural landscape of the upper valley.

There is state-funded assistance for valley enhancement projects, particularly in Massachusetts. However, the availability of state programs is often not known to many of the small communities which lack paid staff to apply for state assistance.

While local and state efforts to protect natural and cultural resources are increasing, much remains to be done. Water pollution and hazardous waste sites still need to be cleaned up; local master plans and zoning and subdivision regulations need upgrading; historical structures and communities need recognition and protection; natural features and special qualities of the valley landscape need further conservation. The protection and enhancement of these resources for public use and enjoyment can only be achieved through the concerted efforts of the citizens of the valley towns and cities backed by the States of Massachusetts and Rhode Island.

Most people interviewed for this study see a positive but limited role for the federal government in recovering the natural and cultural heritage of the Blackstone Valley. While there is no consensus in favor of federal acquisition and management of parkland, there is substantial support for some kind of federal recognition of the valley. Such recognition, it is felt, would both increase the valley's attractiveness to tourists and bolster its self-image, thereby encouraging and sustaining local efforts. Coordination of interstate efforts is another federal role that residents consider appropriate. Some residents would support a federal role in mediating use conflicts in the river corridor, in particular, conflicts between uses of the river for hydropower and waste disposal and public uses, such as recreation. Many historians and residents see a role for the National Park Service in studying and interpreting the valley's undervalued historical resources.

## C. Significance of the Blackstone Corridor

The Blackstone River Valley has significance as the cradle of the American Industrial Revolution. The valley was the first to experience widespread use of water power for industry and, in its towns, independent entrepreneurs developed the Rhode Island System of manufacturing, employing families in the making of textiles and other industrial goods.

Because of the influence of Roger Williams and, later, the growth of transportation networks and the textile industry, the Blackstone Valley developed more ethnic and religious diversity than other parts of New England. The Blackstone Canal, in its own right an important canal in early America, contributed to this growth and to the commercial prominence of Providence and Worcester, now the second and third largest cities in New England.

The Blackstone Valley illustrates several historical themes and subthemes that are, at present, either under-represented or unrepresented in the National Park System. Lowell National Historical Park illustrates several similar themes, but, as the home of the Rhode Island System of manufacturing, the valley is unique. The Blackstone Canal, which is of regional significance, compares favorably with the two other canals in the National Park System. Although a small segment of the Middlesex Canal is included in the park at Lowell, no important New England canal has National Park designation to represent the great canal boom of the 1820s-1840s.

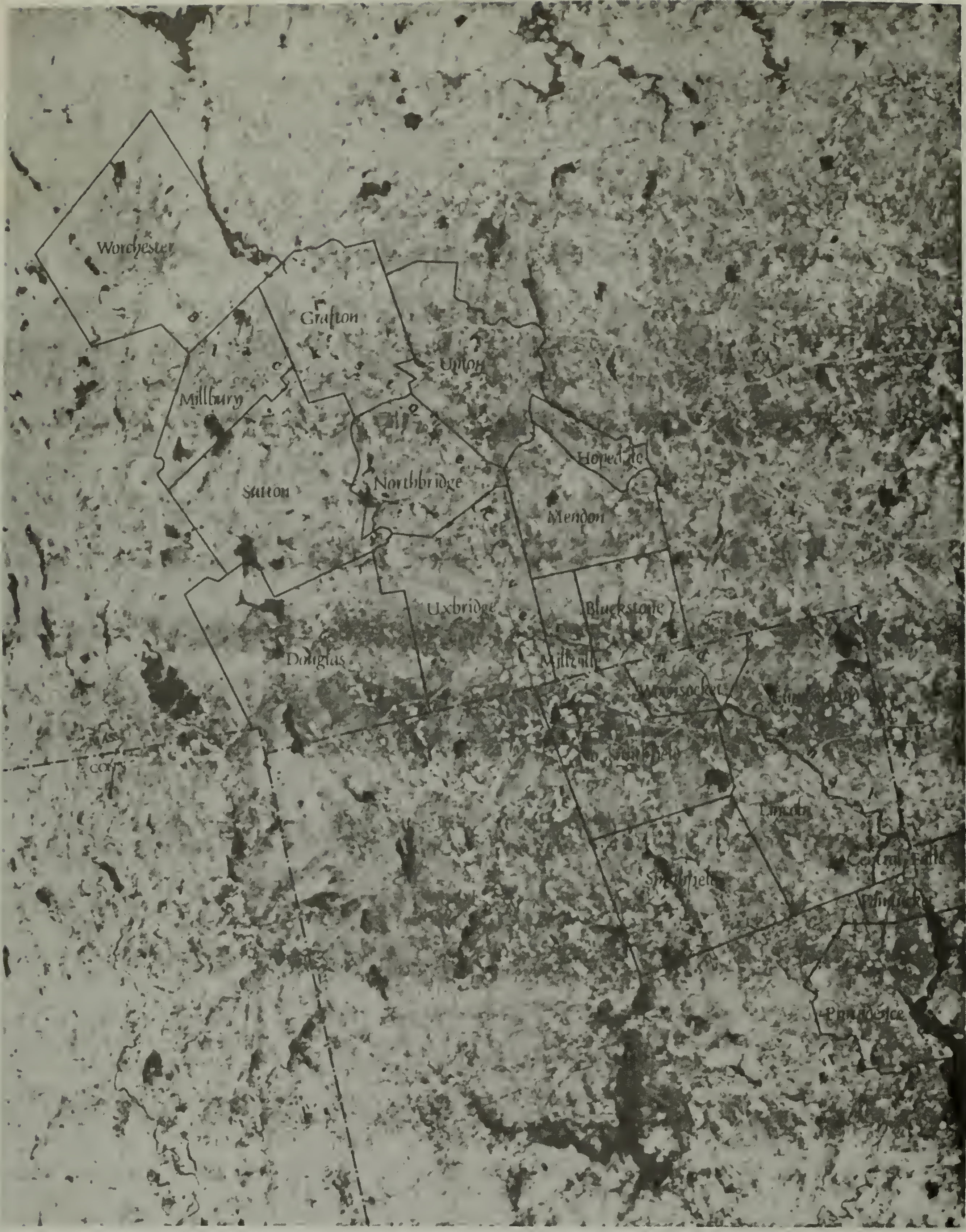
Many of the cultural artifacts and settings which attest to the valley's historical significance have been significantly altered or destroyed, though some important examples remain intact. Protection of these remaining resources for future public use, education and enjoyment is not now assured.

## D. Conservation Options

Federal acquisition and management of nationally significant sites within the valley is not recommended. However, there may be a role for federal assistance in the area of resource interpretation. A major interstate project to interpret the history of the Blackstone Valley would receive enthusiastic support at the local level and would be an important first step in raising local awareness of the valley's cultural resources.

Federal recognition of the valley may be appropriate given its historical significance and its cultural artifacts and settings that have retained their integrity over time. However, such recognition, if awarded, should follow an increased commitment from state and local governments to environmental improvement, protection of the valley's cultural resources, and protection of its rural setting.

Three long-term conservation options for the Blackstone Valley are presented in this report. All rely on the valley's wealth of natural and cultural resources as a lever in renewal. The first option assumes that present efforts would continue, succeed, and gradually expand under the leadership of local groups and the private sector. The second assumes a strengthened commitment to the valley from both states, particularly with respect to coordinating their proposed linear park systems along the Blackstone from Worcester to Providence. Federal response to this increased commitment might be the assignment of NPS staff to continue to assist the states in park planning, management and interpretation. In the third option, in response to even a higher level of state and local activity, the Department of the Interior could support federal recognition for the valley. Federal land acquisition and direct management is excluded from this option.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Northbridge
Sutton
Mendon
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Blackstone
Douglas
Millville
Woonsocket
Cumberland
MASS
CONN
No. Smithfield
Lincoln
Central Falls
Smithfield
Pawtucket
Providence

## RESOURCES OF THE BLACKSTONE VALLEY

### A. Land and Water

#### 1. The River System

The Blackstone River begins buried beneath the City of Worcester. Over its 46 mile course, it flows through 22 units of local government, crossing the state boundary between Massachusetts and Rhode Island. The Blackstone River collects water from a 540-mile area, including large water bodies such as Lake Quinsigamond, the Mumford and Branch Rivers, and many smaller streams and ponds. Flowing in a south-easterly direction, the Blackstone is wide and marshy in places north of Rhode Island. In response to changes in the geology, the river becomes straighter, cutting banks as deep as 100 feet. This change is accompanied by a more dramatic drop in elevation, forming waterfalls that have long since been harnessed by dams for industrial power. Just north-west of Central Falls, the river again widens to create marshlands. In Pawtucket, the river joins the Seekonk which empties into Narragansett Bay.

The Blackstone Canal, built in the 1820's, follows the western side of the river, bypassing its falls. The canal joins with the Moshasuck River to form the Providence River which flows through downtown Providence into Narragansett Bay. From roads adjacent to the river, little of the Blackstone can be seen because of the steep banks and mills and factories which line the river's edges.

The watershed receives an annual rainfall of about 44 inches (111.8 cm) which is evenly distributed throughout the year. Because the basin is located in a high activity storm track, intense local storms occur. The resulting floods, according to a University of Massachusetts study, have caused damage averaging over $200,000 per flood, with the 100-year flood damage reaching more than $3.5 million (Bennett et al, 1983).

*Rice City Pond, Uxbridge*

Mill, Whitinsville

The Blackstone River is vital for life in the region. According to a 1984 study by the U.S. Geological Survey (USGS), the 500 million gallons of water that flow into Rhode Island daily do so mostly by way of the Blackstone River. The drainage basin, with its many tributaries, lakes and ponds, supports a variety of habitats for wildlife and recreational events for people. But the main stem has experienced water quality problems over the past 100 years due to its intensive industrialization and its subsequent use as a convenient carrier for municipal waste. Many reaches of the Blackstone are still polluted by municipal sewage and industrial waste discharges. During periods of low to moderate flow, water quality is poor.

According to a 1974 USGS study, the biological and physical quality of the basin's groundwater is "generally excellent" (Johnston and Dickerman, 1974, sheet 2). Recently however, there have been serious incidents of groundwater pollution in the valley, and a number of hazardous waste sites near the Blackstone are included in the National Priorities List of the U.S. Environmental Protection Agency (EPA). Although the water quality of the Blackstone has improved over the last decade, much work remains to be done.

### 2. Geology, Vegetation and Wildlife

The glaciers that once covered the valley left a landscape of gently rolling hills and rocky, acidic soils. The landscape is also marked by large rock outcrops, some along the river's edge. The glacial deposits lie over a bedrock of granite and limestone, both of which were economically important building materials as the valley was settled and grew.

The Blackstone Valley is part of the oak forest of New England. Dominant trees are oaks and beeches with some maples and ash. White pines tower above these deciduous trees to a height of 100 feet (30.5m). Within the forests are cooler spots that support shady groves of hemlocks and dense understories of mountain laurel.

The vegetative pattern along the river is varied. Second growth forests are often edged with birches and aspens that can endure frequent flooding. Islands and other low-lying areas are vegetated with high bush blueberries, willows and alders. Wetland meadows are covered with hummocks of grasses, sedges and rushes which attract migratory birds. Land along the industrial edges of the canal and river is covered with invasive species such as birch, sumac, alder, blueberry and raspberry. Prior to European settlement, several anadromous fish species were found in the Blackstone. Today, introduced game species of fish dominate, although poor water quality limits their numbers (Demain and Guthrie, 1979). Despite the effects of settlement, a large variety of mammal species can be found (Jorgensen, 1978).

## B. History

Researchers from Harvard University date the earliest presence of people in the region from roughly 10,000 to 12,500 years ago in the Paleo-Indian period immediately after glaciation (Rosebrock et al., 1982). These early people were semi-nomadic hunters and gatherers who lived in temporary camp sites along the Blackstone River. Agriculture began in about A.D. 1160 (Rosebrock et al., 1982). The crops of corn (maize), beans, and squash introduced to the early European settlers by the Narragansett and Wampanog Indians were important to the development of European agricultural settlements in New England.

In spite of good intentions, relations between the native people and the European newcomers can be summarized as a series of broken treaties, misunderstandings, and wars, which led to the subsequent decline of the indigenous culture.

English settlement began in 1635 with the arrival of William Blackstone, a clergyman. Many of the early settlers, were Friends or Quakers, seeking the freedom to practice their religious beliefs in Rhode Island, which was known for its tolerance.

The water power potential of the river and its waterfalls played an important part in the development of the regional economy. The Blackstone's water power was first developed in 1671 by Joseph Jenckes, Jr. when he built a water wheel at Pawtucket to operate a forge, sawmill, and carpenter shop (Halberg et al., 1961). Slater's Mill in Pawtucket was the first water-powered cotton mill in America.

This mill was the result of the enterprise of Providence merchant Moses Brown and his son-in-law, William Almy. Both were Quakers and familiar with the spinning jennies first imported to America through Philadelphia in 1775 by Christopher Tully, another Quaker. The use of water power to spin cotton had been developed in England, but the technology was a closely-guarded secret. Brown and Almy brought Samuel Slater, an Englishman with a working knowledge of his native country's water power technology to Pawtucket to build the first mill in 1790. In 1793 an improved mill was built on the Blackstone by Slater, Brown and Almy. The new mill employed over thirty people, most of them children from nearby farms (Dunwell, 1978).

Slater, Brown and Almy, separately and in partnership, continued to develop mills along the Blackstone and its tributaries. The three were involved in several more innovations, such as the use of steam power. They also helped to start several other small, family-based enterprises. In a classic study of the development of the early New England cotton manufacture, Caroline Ware noted about Brown and Almy:

"The old Providence firm was indeed the parent of the American cotton industry, for it was responsible, directly or indirectly, for the erection of most of the 27 mills which the Secretary of the Treasury discovered in operation in Rhode Island, southern Massachusetts and eastern Connecticut in 1809" (1931, pp. 27-28).

The manufacturing method developed by Slater, Brown and Almy, called the Rhode Island System, was characterized by family partnerships started with minimal capital derived from commerce and agriculture. The owner was usually responsible for on-site management; labor was provided by the families, including children. Housing was built for families. The mill village became the dominant community form.

After much debate between the political and business interests of the Blackstone Valley and those of Boston, the Providence to Worcester Canal was begun in 1823. The towboat canal opened in 1828 to transport goods between the two cities. The construction of the Providence to Worcester railroad along the river made the canal uncompetitive, and the Blackstone Canal quickly lost its prominence as railroad transportation took over. However, the impact of the canal on the development of Providence, Worcester and the towns and villages of the valley was considerable.

The transportation network of canal, railroad and turnpikes coupled with the water power of the Blackstone provided stimulus for dramatic growth. By the 1830s, the Providence waterfront housed the offices and warehouses of the textile manufacturing companies of the Blackstone Valley. Raw materials (cotton, wool, oil and coal) and finished products moved in and out of the city.

The textile industry and other manufacturing thrived in the Blackstone Valley until the 1920s. In the following decades, changes in technology and cheaper labor drew the traditional industries away from New England in general and the Blackstone Valley in particular.

## C. People

### 1. Demography

The Blackstone Valley is ethnically and religiously heterogenous compared to much of rural New England. This diversity was encouraged by early religious tolerance in Rhode Island. The first settlers were of English descent -- Congregationalists and Quakers. Canal construction and mill work attracted large numbers of Irish and French-Canadian settlers from the 1820s into the 20th century. From mid-century on, Germans, Swedes and Dutch moved to the valley.

From 1890 to the first World War, immigrants came largely from southern and eastern Europe. These groups included Italians, Greeks, Portuguese, minorities from the Turkish Empire (Armenians, Syrians, and Lebanese), Poles, Jews, Lithuanians, and Ukrainians, many of whom were fleeing political and religious oppression. Discriminatory immigration laws, the world-wide economic depression of the 1930s, and the second World War dramatically slowed immigration from Europe. During this period black American immigration began from the rural South, although small numbers of black people had lived in the valley since the previous century. However, the immigration of black people to the valley was modest compared to other large manufacturing cities of the north.

Since the second World War, immigration into the lower valley region has been dominated by people from Portugal, Cape Verde, Puerto Rico, Cuba, Venezuela, the Dominican Republic, Mexico, and Columbia, and from Japan, China, Korea and Vietnam. (Conley, 1982, and Aldrich, 1972, and U.S. Census, 1980). The Massachusetts portion of the valley has received less of this recent immigration than the Rhode Island portion.

### 2. Population Growth

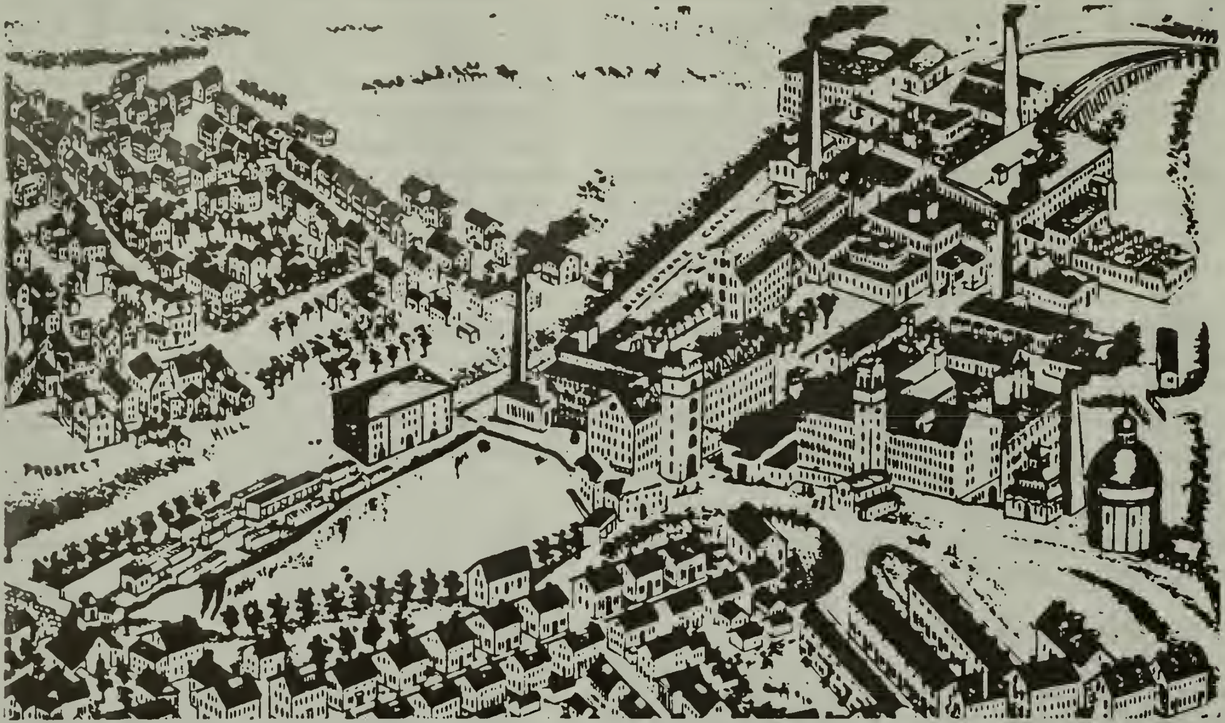
The patterns of population growth differ between the major cities at either end of the valley and the smaller cities, towns and villages in between (see Appendix, Table 1). Both Worcester and Providence have experienced significant out-migration over the last 40 years, while the rest of the valley has experienced moderate growth in the same time period.

### 3. Employment

While overall employment in the valley has remained relatively stable, the manufacturing sector has experienced a sharp decline. In the Massachusetts portion of the valley, 33 percent of manufacturing jobs was lost between 1969 and 1980 (CMRPD, 1983). Some parts of the valley have more than twice the unemployment rate of the rest of Massachusetts. The Rhode Island towns have experienced a comparable loss of manufacturing jobs and high unemployment in the industrial sector. In both states, lower-paying service jobs have replaced some of those lost in manufacturing.

### 4. Attitudes

While an attitude of self-reliance prevails throughout the valley, this attitude tends to be much stronger in the villages and small towns than in the cities. The rural communities in the valley have shown a preference for working independently from other towns. The idea of a regional effort at revitalization is quite new to the rural parts of the valley. However, with suburban development in and around the rural communities of the upper valley, some of the established views may begin to change as the newcomers become more politically active. By contrast, the valley's urban areas have undergone rapid, extensive changes both in terms of physical development and demography. The cities clustered at both ends of the valley are more likely to take on joint projects and to seek help from state and federal agencies.

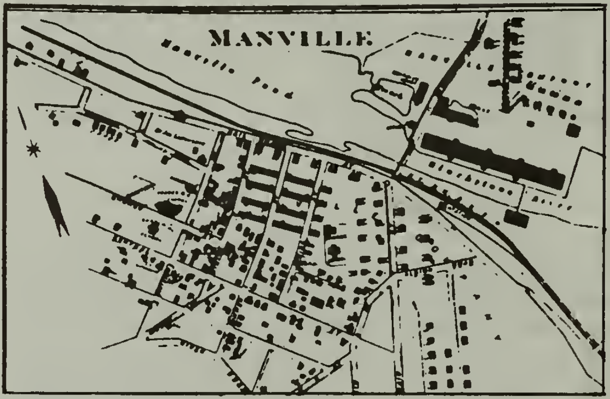


*Lonsdale, Rhode Island (1888)*

## D. Settlement Pattern and Land Use

The valley's industrial development shaped the settlement pattern visible today. As water-powered industry developed, it moved upriver with the densest clustering towards the lower end of the river where the amount of falls and power were the greatest. Farther north, settlement was more dispersed, and there was less expansion into the rural landscape.

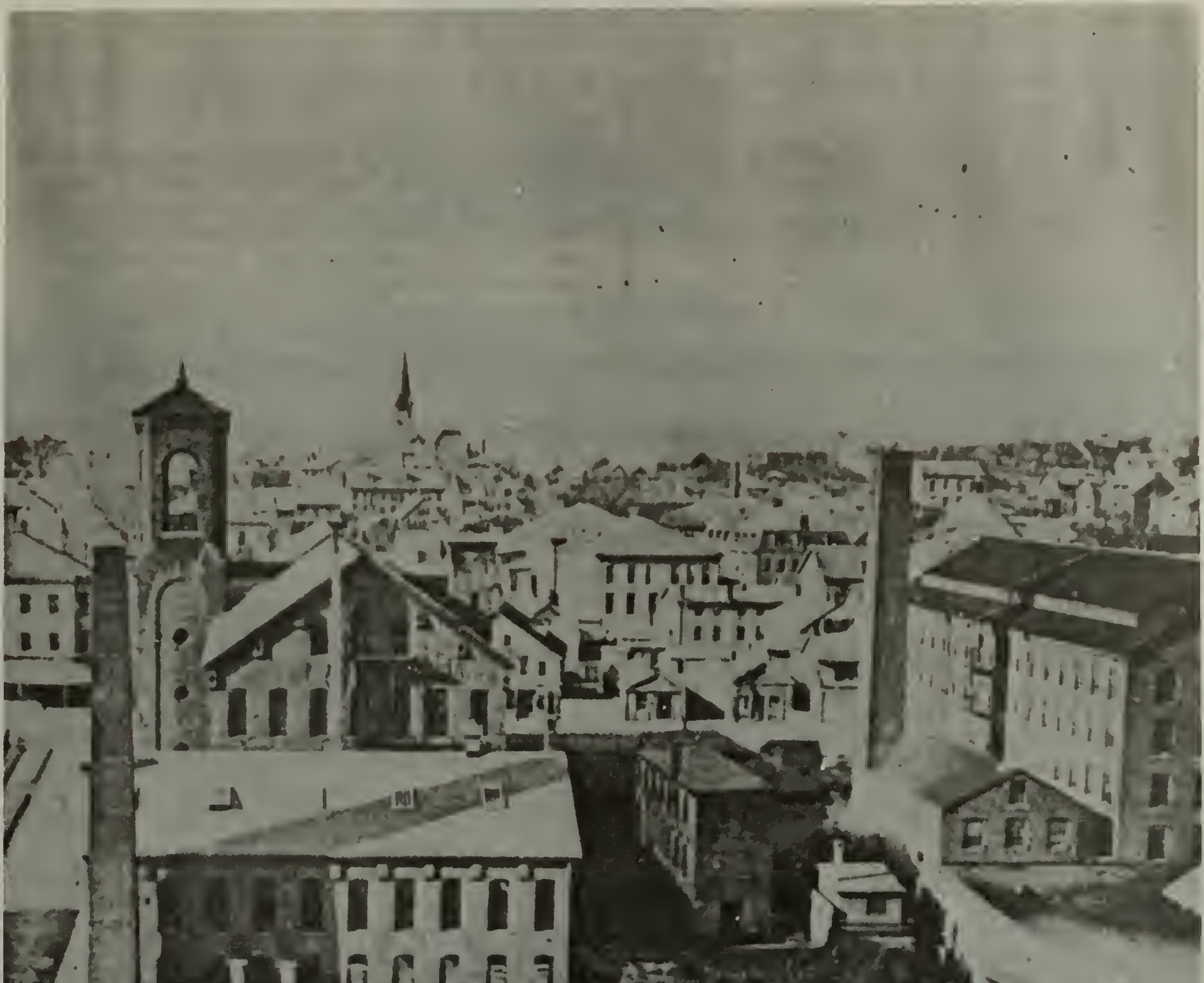
Mill buildings were built of brick or native granite, with rows of large windows on each floor. Many of these sturdy structures have survived long years of abandonment. Worker housing was built adjacent to mills and factories. The two-family attached houses were densely arranged in villages. The housing pattern of the mill towns reflected the hierarchy within the mill economy. Houses of factory supervisors were set on hills above those of the rest of the workers. Still higher, mill owners lived in spacious mansions. In some parts of the valley, mill owners planned and built entire towns with shops, schools, libraries and town halls. Many of the former mill owners mansions have been torn down or converted to new uses. Some of the planned communities, such as Hopedale and Whitinsville, have retained their cohesive character.



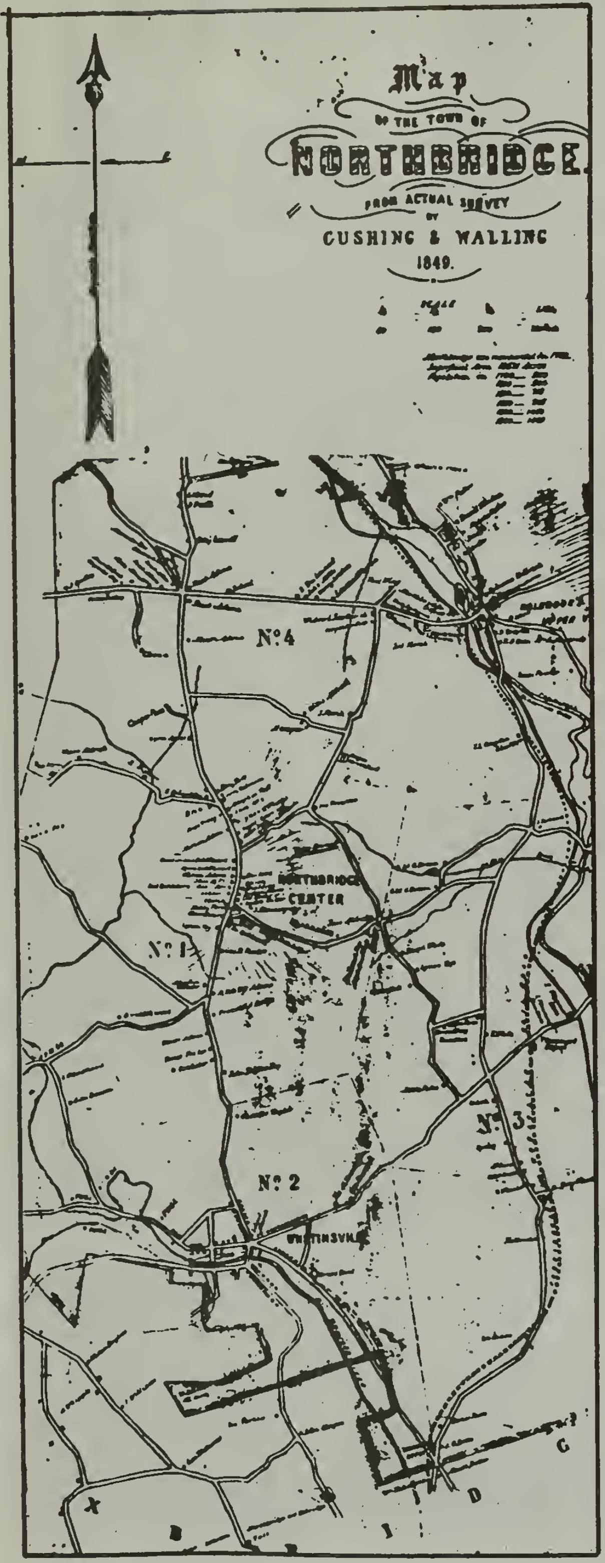
*Manville 1895*

Before mills began to dominate the valley, towns had been built on higher ground. In Massachusetts, these communities are typically centered on a town commons.

While little remains of the farm landscape in the southern valley, farms are still a strong landscape feature in the north. Because agriculture pre-dates mill deve-



*Pawtucket, Circa 1882*

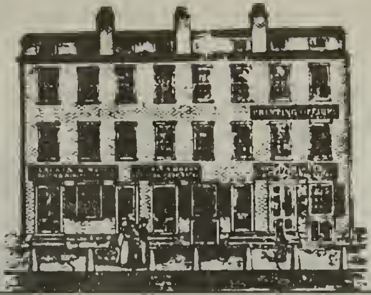


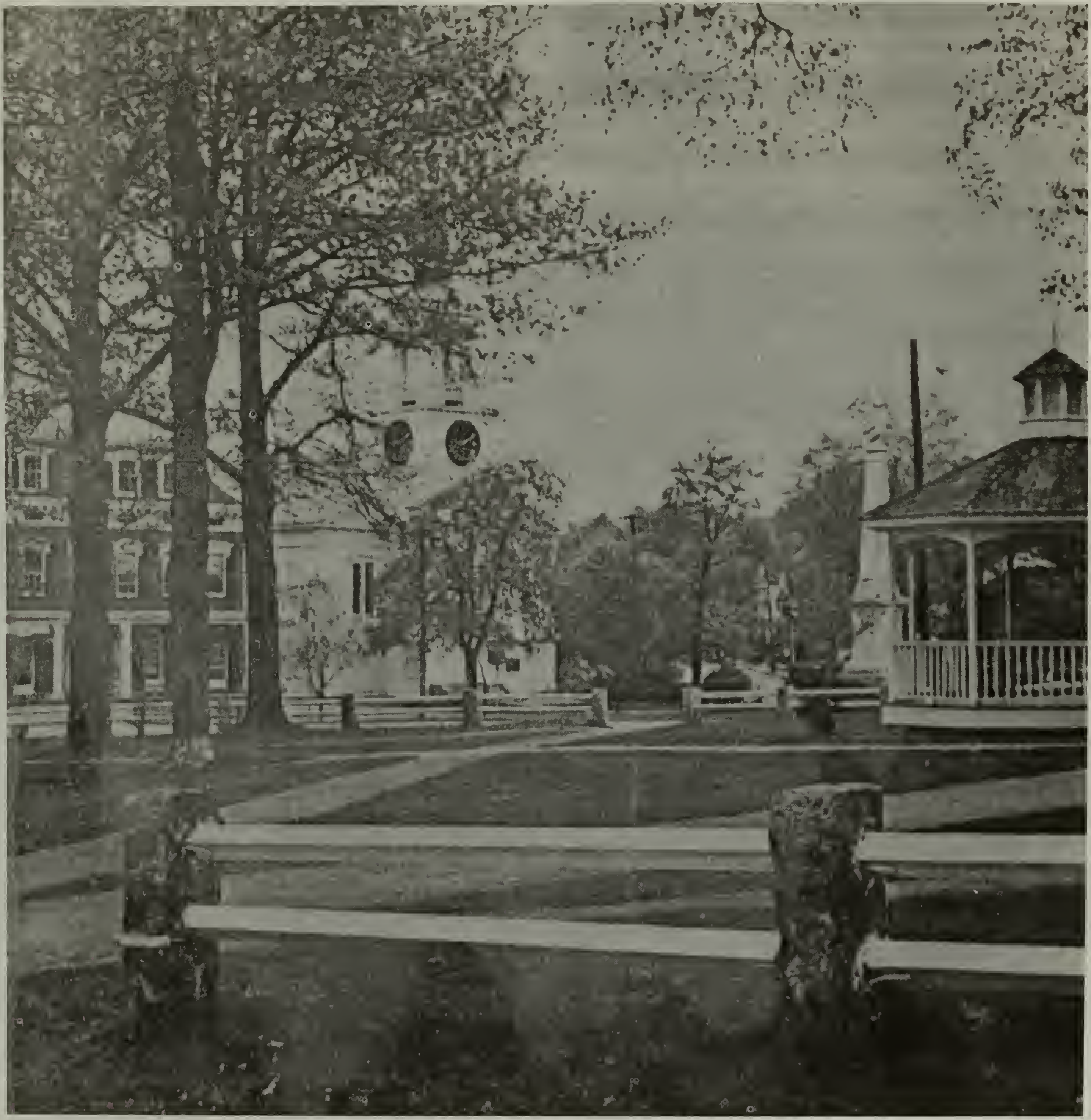
lopment, these farms are some of the oldest settlements in the valley. A typical farm has a clapboard farmhouse and massive timber barn set in rolling fields divided by stone walls. On working farms, farmers continue to raise cattle, horses, and sheep and maintain small orchards. Other farms have been "gentrified," and many have been taken over by new housing, either in two-acre parcels or in small lot developments. Recently, developers have proposed condominiums and other kinds of clustered housing in the valley. A few such proposals are now under consideration by town planning boards.

New residential growth has been mostly concentrated in two areas of the upper valley. The rural towns south of Worcester are rapidly suburbanizing, and there is growing pressure on the eastern side of the valley in Massachusetts, largely as a result of the continued success of the high-technology industries radiating from Interstate 495. Attracted by the valley's relatively cheap housing and the feasibility of commuting to areas close to 495, people are starting to move into the valley, settling for the most part just outside its village and town centers.

Land-use information for the valley has been compiled by researchers at the

*Wheelockville*





Town Commons, Grafton

University of Massachusetts and the Rhode Island Statewide Planning Program.

In Massachusetts, forest land is most common (see Appendix, Table 2). In both states, the major changes were the losses of agricultural and open land and a gain of urban land. Continued loss of agricultural land is predicted (MacConnell and Niedzwiedz, 1974). In both Massachusetts and Rhode Island, updated land use information for the valley is needed. More detailed analysis is necessary, particularly in Rhode Island, to determine the actual decline in farmland and its causes and impacts.

Local land use controls vary greatly in the Blackstone Valley. The enabling legislation for local use regulations in Massachusetts is provided by the Zoning Act (Massachusetts General Law, Chapter 40) and the Subdivision Control Law (MGL, Chapter 41). In Rhode Island, the relevant statutes are found in Title 45 of the General Laws of the state. Chapter 22 of Title 45 addresses the establishment and function of a local planning board or commission and comprehensive plans, Chapter 23 involves subdivisions and Chapter 24, zoning ordinances (Howe, 1981). The preparation and adoption of a comprehensive or master plan is optional in Massachusetts and required in Rhode Island where such plans must also conform to the state plan. However, in neither state are zoning and subdivision regulations required to conform to master plans. Zoning ordinances and subdivision regulations are, in effect, the primary land use controls at the local level in both states. (See Appendix, Table 3).

House, Lincoln

# SIGNIFICANCE OF BLACKSTONE VALLEY RESOURCES

## Introduction

Congress requested that the National Park Service assess the national significance of the Blackstone River corridor. Congress also asked the National Park Service to determine, given the relative significance of the corridor's resources, whether the area was potentially eligible for inclusion in the National Park System. For the purposes of recommending future conservation options, this study assesses the natural, scenic and cultural resources of the Blackstone Valley. These assessments are based upon local, state, regional and national perspectives.

## A. Natural, Recreational and Scenic Values

Through their Natural Heritage Programs, both Massachusetts and Rhode Island have identified sites of statewide significance that shelter threatened and endangered species or important natural communities. The Massachusetts Natural Heritage Program has, to date, identified 15 sites in the upper Blackstone Valley where 13 different kinds of rare plants and animals have been sighted. In Rhode Island, the Natural Heritage Program has identified Lonsdale Marshes, an extensive inland marsh in the Blackstone Valley town of Lincoln, as one of 14 statewide priority sites. It is considered to be the most valuable wetland habitat in northern Rhode Island.

At the national level, no areas in the valley have been recognized for biotic diversity, occurrence of endangered species or geological rarity. In the valley there are no National Wildlife Refuges, no National Natural Landmarks and no potential such landmarks. No nationwide conservation organization, such as the Nature Conservancy or the Audubon Society, has any holdings in the valley.

The Blackstone Valley connects the second and third largest cities in New England and is only 25 miles from Boston, the region's largest city. If only because of this closeness to large urban populations, the valley has high recreational potential within the region. However, the Statewide Comprehensive Outdoor Recreation Plans (SCORPs) in Massachusetts and Rhode Island do not single it out as a place for large-scale recreational development. Massachusetts manages about 8,000 acres of recreational land in the valley. An additional 100 acres will be purchased to augment the Blackstone Valley Heritage Park. Rhode Island DEM manages several areas in the lower valley, totaling about 850 acres. The Army Corps of Engineers manages the only federal recreational area in the valley.

The only scenic evaluation of the valley is The Massachusetts Landscape Inventory which describes certain landscapes in the town of Grafton as having statewide significance (Mass. DEM, no date). Forest land is the major land use in both Massachusetts (62 percent) and Rhode Island (42 percent). Much of this wooded land is on the valley slopes and adds to its beauty.

## B. Historic and Cultural Values

### 1. Significance

The valley is a region of mixed urban and rural character with a concentration of areas important to industrial history. The mills, villages and associated transportation networks and the social history of the settlers who lived and worked in the Blackstone Valley together tell the story of the industrialization of 18th and 19th century America. The technology and organization of manufacturing pioneered in the Blackstone Valley influenced industrial development in the rest of the country. The textile manufacturing centers which developed in Pawtucket, Millbury, Hopedale, Northbridge, Worcester, and Providence in the late 18th and early 19th centuries constituted one of the most important machine-making districts in the nation. From the Blackstone Valley, an appreciation of the larger national patterns of industrial development may be gained.

Three factors distinguish the Blackstone Valley from other industrial regions:

- It was the first such region in the United States;

- It represents the first wide-spread use of water power for industry in the United States; and
- It was where the Rhode Island System of manufacturing was developed.

Two additional factors distinguish the Blackstone Valley from other industrial regions in New England:

- It was more ethnically and religiously diverse earlier than the rest of New England; and
- The Blackstone Canal was crucial to the development of the second and third largest cities in New England.

Historians have identified a wide range of mill buildings and villages spanning nearly two centuries of development, use, and reuse (Stachiw, 1984). Among the many examples identifed by historians as significant are Slater's Mill, the Slatersville mills and village, and Wilkinson Mill. In Pawtucket, Samuel Slater, Moses Brown, and William Almy built the first water-powered cotton spinning mill in the United States in 1790 and later improved Slater's Mill in 1793. Samuel and his brother, John Slater, were also instrumental in the development of the Slatersville mills and village in North Smithfield on the Branch River in 1806. The Wilkinson Mill, built in 1810, in Pawtucket was the first steam-powered mill in the United States.

The first large-scale use of water power for industry in North America occurred on the Blackstone and Branch Rivers. By 1844, 94 cotton mills lined the banks of the Blackstone River. It had become "the best harnessed river in the United States" (Dunwell, 1978, p.74). The many, moderate falls of the Blackstone River were especially suited for harnessing by small companies, needing only limited power.

The Rhode Island System, founded in the Blackstone Valley, spread rapidly through southern New England in the early 19th century. It was shaped by relatively small-scale entrepreneurs, who pooled their resources and ideas to build mills along the river. Later industrial centers, such as Lowell, were more large-scale and capital-intensive. The Rhode Island System has been contrasted with the Waltham System, used at Lowell, by a number of historians. Each represents a distinct tradition in manufacturing. Table 3 provides a summary of the classic features of each.

In the Rhode Island System, mill companies were often family-owned and the work force itself was comprised of family members. According to a Clark University social historian:

"The family employment model, which was imported from England by Samuel Slater in the late eighteenth century, was most prevalent in, but not restricted to, small company-owned industrial villages in Rhode Island and southern Massachusetts" (Tamara Hareven, 1982, p.3).

**Table 3.**

**Comparison of Mill Systems**

| Classic Features | Rhode Island System | Waltham System |
|---|---|---|
| OWNERSHIP | families and partnerships | joint stock |
| CAPITALIZATION | often minimal | large |
| POWER AT SITE | less than 1,000 HP, often less than 100 HP | more than 1,000 HP, often much higher |
| DISTRIBUTION | arranged independently by each mill | power canal system shared by several mills or companies, often leasing power form a promotional agency |
| ON-SITE MANAGEMENT | owner | agent |
| LABOR | children and families | young women preferred |

| Classic Features | Rhode Island System | Waltham System |
|---|---|---|
| HOUSING | family houses and tenements | boardinghouses |
| PRODUCT | emphasis on diversity | emphasis on mass production |
| SALES | sold direct | agency |
| COMMUNITY FORM | village | city |
| EXAMPLE | Blackstone Valley | Lowell |

Adapted from Dunwell, 1978.

The religious and ethnic diversity of the Blackstone Valley was initially due to the religious tolerance of the founders of Rhode Island. Diversity increased with the advent of manufacturing and the construction of the Blackstone Canal. Whereas those of English descent took the leadership in industry elsewhere, more than one ethnic group had business success in the Blackstone Valley. In Woonsocket, a number of French entrepreneurs were active. This resulted in the transfer of French industrial technology, capital investment from Paris, the immigration of French-Canadian workers and French managers, and a strong French influence in local architecture. In Northbridge, farmers from the Dutch province of Friesland were induced to settle to produce food for the mill workers. Descendants of these farmers are among the important farmers and landowners in the upper valley.

Today the members of these ethnic communities can provide important information for the study of the impacts of industrial growth, as seen and felt by different groups at different times. Oral histories, photographic research, and the study of ethnic fraternal, religious, and union societies are rich fields for further investigation of the adaptation of different cultures to the American industrial experience.

The study of community life and the work place in industrial America, a relatively new interest in the United States, received a boost from the development of the Lowell National Historical Park. The Blackstone Valley represents an invaluable resource for further study.

There has been no nationwide evaluation of the relative significance of American canals.* However, the American Canal Society has listed the Blackstone Canal as one of the 36 most important canals in the early American canal period of 1786-1851 (Hahn et. al., 1980). The regional significance of the canal stems from its influence on the development of Providence, Worcester, and the towns of the Blackstone Valley as prominent centers of manufacturing and trade.

Nationally, the canal may be compared to its contemporaries, the Chesapeake and Ohio Canal and the Middlesex Canal. The Chesapeake and Ohio was first proposed in 1774, the Middlesex in 1793, and the Blackstone in 1796. The Chesapeake and Ohio connected Washington, D.C. to Cumberland, Maryland, running some 184 miles. Originally called the Pawtowmack Canal, the Chesapeake and Ohio developed incrementally over many years, unlike the Middlesex and Blackstone which were planned and built as complete projects. The Middlesex runs 27.5 miles from Boston to Chelmsford through Lowell. It was initiated by a group of Boston backers, who perceived the Blackstone project as a threat and worked to block it. The Chesapeake and Ohio was important to the opening and settlement of the Old Northwest Territories and the Potomac River Valley, a role the Blackstone and Middlesex Canals played in New England.

### 2. Integrity

The historic structures and communities of the valley vary greatly in terms of retention of their original qualities and relationships. While many individual structures remain in sound condition, some historic communities have lost much of their distinctiveness, and the once-clear, town and country pattern of settlement is now blurred in many places. Much of the history that has been obscured, however, could be revealed anew through skillful interpretation.

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* Such an evaluation is currently being undertaken by the Canal Museum, Hugh Moore Park, Easton, Pennsylvania (Metz, 1984).

Despite the many that have been torn down or otherwise destroyed, the valley still contains a wealth of historic buildings. Many of these are on the National Register of Historic Places, and many more are potentially eligible. Complexes of mills and mill housing in good condition can be found throughout the valley. Farmsteads, churches and commercial buildings from an earlier period are also present. Some of these buildings have been restored to their original condition, while some have been seriously compromised in attempts to modernize them. Along the Blackstone canal, only a few original structures remain. However, much of the canal's towpath is intact, as is the Millville lock, one of a handful of stone locks remaining in New England.

In the upper valley, there are still settlements clustered within a largely rural landscape. Suburban development is eroding this pattern, and in the lower valley boundaries between communities and between communities and landscape are now hard to distinguish.

Environmental degradation, including pollution and incompatible land uses, is another factor that diminishes the integrity of the valley's historic resources. Much of this degradation could be reverse through continued and concerted efforts.

### 3. Representation in the National Park System

Suitability for inclusion in the National Park System is the product of several factors including significance and integrity. To be suitable for inclusion in the system an area should also represent themes presently unrepresented or poorly represented in the system, or should transcend related park units in resource values or interpretive potential.

Several National Park Service themes illustrated by the Blackstone Valley are either inadequately represented or unrepresented within the current system. The themes include: European Exploration and Settlement (II), American at Work (VII), The Contemplative Society (VIII), and Society and Social Conscience (IX).

Subthemes include: English settlement (II,C), commerce and industry (VII,B), science and invention (VII,C), transportation and communication (VII,D), engineering (VII,F), American ways of life (IX, A), and social and humanitarian movements (IX,B) (National Park Service, 1982). Lowell comes the closest to representing several of these themes and subthemes, but in its illustration of the Rhode Island System of manufacturing, the Blackstone Valley is unique. (See Table 4)

The Blackstone Valley is a vivid illustration of the theme of America at Work, as the Rhode Island System of manufacturing played a pivotal role in the development of the Industrial Revolution. Invention, water, transportation and communication, commerce and industry and energy transmission are subthemes which illustrate America at Work in the Blackstone Valley. The Lowell National Historic Park currently represents these themes, however the Blackstone Valley developed earlier and had a different system of technology, management and labor. Transportation and communication are represented in the National Park System by the Chesapeake and Ohio National Historical Park (the Chesapeake and Ohio Canal) and the Cuyahoga Valley National Recreation Area (the Ohio and Erie Canal). Although a small portion of the Middlesex Canal has been included in the National Park System as a part of the Lowell National Historical Park, no large area of a regionally significant canal in New England has been designated to represent the great national canal boom of the 1820s-1840s.

The Settlement of New England, and Society and Social Conscience are other themes evident in the Blackstone Valley and poorly represented in the National Park System. The settlement of Rhode Island was unique in New England. Due to the influence of Roger Williams and his followers, many religious minorities, such as the Quakers, found a haven in Rhode Island.

The labor movement is now an unrepresented subtheme in the system. Important elements of American labor history, specifically the history of child labor, developed in the Blackstone Valley. Children constituted nearly 70 percent of the mill labor force, and the dismal working conditions which ensued were cause for many of the labor reforms of the 19th century. The Pawtucket area was the setting for some of the first textile worker strikes in the early 19th century and union strikes in the early 20th.

**Conclusion**

The Blackstone corridor is not recommended for consideration as a national park. While the area is of national significance to American industrial history and does contain certain themes underrepresented in the National Park System, overall resources lack the integrity necessary for national parks. There appears to be strong support for current efforts by both states to develop parks in the corridor, and, as outlined in the Conservation Options section of this report, the National Park Service could remain active in supporting local and state park and planning in the valley.

## CONSERVATION OPTIONS: POSSIBLE PARTNERSHIPS

### A. Existing Programs and Institutions

### 1. Local, Regional and Private

Over the last several years, groups in the valley have made substantial progress towards revitalization -- rebuilding the economic base, upgrading the environment and preserving the cultural heritage. Some of the resources in the valley currently receive adequate protection and are likely to remain available for public appreciation and use. Other resources face a variety of threats.

Efforts of an environmental nature tend to center on the Blackstone River -- cleaning it up and making it accessible for public enjoyment. In Rhode Island, CANAL (Commission for the Advancement of the Natural Areas in Lincoln) was formed in 1967 for this purpose and has since been involved in clean-up campaigns along the canal and river, in park development proposals, in zoning improvements within the floodplain and in court actions against illegal polluting or filling of the river. The Blackstone Watershed Association (BWA) in Massachusetts also sponsors clean-up, replanting and "beautification" projects, reports pollution violations and encourages the formation of watershed associations for ponds and tributaries of the Blackstone. In turn, CANAL and BWA rely on other volunteer organizations in the valley (including scouts, Jaycees, schools and church groups) for their clean-up and fund-raising campaigns. Both BWA and the Rhode Island Canoe Club promote recreational use of the river through canoe races each spring. The canoe club has also committed most of its membership dues over the past several years to re-establishing a periodic flow year-round through a 2800-foot long gorge which affords the only Class 3 whitewater canoeing in Rhode Island.

Historical societies have played a central role in maintaining the valley's cultural traditions and historic architecture. These groups sponsor local events, publish books on local history, provide signage for historic structures and sometimes buy and restore such structures. A number of the valley's significant structures are on the National Register of Historic Places, which provides them some protection. Most of these protected structures and districts are in Rhode Island, where all towns and cities have historic surveys. In Massachusetts, only three jurisdictions in the upper valley -- Worcester, Millbury, and Uxbridge -- have completed surveys.

The major groups concerned with economic development are, in Massachusetts, the Blackstone Valley Economic Development Council, the Worcester Area Chamber of Commerce and, in Rhode Island, the Blackstone Valley Chamber of Commerce and Greater Woonsocket Chamber of Commerce. Although these groups concentrate their efforts on filling vacant industrial buildings with new users, they have also lobbied successfully to improve transportation access to the valley through upgrading of Route 146 and, in Massachusetts, have contributed funds to hire a grants coordinator for the valley. A five-town master plan update now in progress in the towns of Douglas, Uxbridge, Northbridge, Sutton and Millbury can be credited largely to the Blackstone Valley Economic Development Council. While the update is confined to the Route 146 corridor in these towns, the data gathered in the process will likely affect zoning town-wide. The Council has also been instrumental in plans to study the potential for developing tourism in the valley.

In addition to these private groups, there is a structure of official, local groups -- planning boards, conservation and historical commissions -- given certain authorities under state law. For example, local planning boards in both states have the authority to develop plans, administer subdivision ordinances and advise town and city councils about land use regulations. Also, in both states there are agencies which help to coordinate local planning efforts and offer advice on technical planning matters. The Rhode Island Statewide Planning Program, Rhode Island Department of Community Affairs, and the Central Massachusetts Regional Planning Commission (CMRPC) perform these functions. CMRPC has a small matching grant program to encourage local planning as well.

Universities are another source of assistance for revitalization efforts in the Blackstone Valley. The University of Massachusetts, Worcester Polytechnic, the Rhode Island School of Design and the University of Rhode Island have all done resource studies of the valley. Offered through the state universities, Cooperative Extension staff serve the farming community, mostly with technical information. Some of those interviewed believe academic institutions could be more closely linked with a long-term conservation strategy.

Some residents feel a valley-wide strategy for revitalization, both environmental and economic, needs to be shaped and strongly articulated. Others stress the need for better coordination of existing efforts, thinking, perhaps, that developing a valley-wide consensus on strategy would take too long or that implementing the strategy would demand too much organization from the many independent-minded jurisdictions that make up the valley. Local communities have the power and authority to develop comprehensive land use regulation. However, many towns lack the fiscal capacity to develop such tools.

Right now, residents, local officials and business people are giving generously of their time to attend many meetings, take part in clean-up campaigns along the river and in towns, and raise money. The consensus among residents and state officials is that more full-time staff would help make local efforts more effective.

### 2. State Level

There are a number of programs at the state level in Rhode Island and Massachusetts to encourage economic development, sound environmental management and historic preservation, all of which will be key elements in valley revitalization. Economic development programs generally take the form of tax incentives, financing assistance, industrial revenue bonds, direct loan programs, mortgage insurance and loan guarantees, training and technical services. Areas of focus include downtown revitalization, transportation improvements, attraction and formation of new enterprises, and expansion of existing ones. Environmental programs in the two states are equally diverse. Regulatory programs address wetland protection, air and water pollution, control of pesticides and herbicides, farmland and floodplain protection, soil erosion and sediment control, environmental impact analysis, sewage disposal and solid and hazardous waste disposal. Other environmental programs involving land acquisition and management provide public access to open space, fish stocking and enhancement of wildlife habitat.

In Massachusetts, state agencies with major programs affecting the revitalization of the Blackstone Valley include the Departments of Environmental Management (DEM), Environmental Quality Engineering (DEQE), Public Works (DPW), Commerce and Development (DOCD), Community Affairs (DCA), and Food and Agriculture (DFA). Other state agencies with an interest in the Blackstone include the Massachusetts Historical Commission (MHC), the Executive Office of Communities and Development (EOCD), and the Governor's Office of Economic Development. In Rhode Island, state agencies involved in the Blackstone include the Department of Environmental Management (DEM), the Office of State Planning, the Department of Economic Development, the Historical Preservation Commission, and the Department of Transportation.

Of state programs to protect the natural and cultural resources in the Blackstone Valley, three are especially important. In both states, the Departments of Environmental Management are involved in developing linear parks along the Blackstone. In Massachusetts, the state has acquired 860 acres along the river and plans to buy 100 more for the Blackstone Valley State Heritage Park between Uxbridge and Millville. Designs for the park have been approved and construction funds set aside. In Rhode Island, DEM is developing a "guide plan" for a linear park between Providence and Woonsocket. Passage of a November, 1984 Heritage Bond which would earmark $1 million for a Blackstone linear park and aid in land acquisition and development. DEM in Rhode Island also manages about 850 acres of parkland along or close to the river.

In 1981, the Blackstone River and Canal Commission was formed in Massachusetts to help direct the planning and design of a State Heritage Park along the Blackstone. In 1984, a Citizen's Advisory Committee was formed to advise state planners in Rhode Island on a Blackstone linear park. Together these advisory groups represent all of the valley.

In Rhode Island, state efforts in the area of historic preservation are particularly impressive. Through the state Historical Preservation Commission, all the valley towns have been surveyed for their historically significant structures, and many buildings are on the National Register of Historic Places. In Massachusetts, the preservation of village centers, town squares and commons receives some attention, partly through historic surveys and partly through state programs. The most recent DEM budget and bonding authority included funds for a $7 million program to upgrade squares and commons in the towns and cities of Massachusetts. DEM's latest budget also set aside $13 million for the rehabilitation of Olmsted Parks, including Elm Park in the City of Worcester. In addition, $500,000 for grants to towns for master planning assistance is available to some regions of state. $100,000 for such assistance to the Blackstone Valley was struck from the 1985 DEM budget. The Main Street Program of the Department of Communities and Development provides planning guidance and seed money to revitalize downtowns.

Many towns in the upper valley lack historic surveys. However, the MHC has just an overview of Worcester County and plans to hold regional workshops to help the valley's local historical commissions complete surveys and nominate properties to the National Register.

State accomplishments in the improvement of the Blackstone River's water quality are also substantial. Since 1972, in Massachusetts alone, over $75 million in combined state and federal funds, has been spent to upgrade the river from Class D to C. A major sewer separation project in Worcester, now under construction, will improve water quality still further for Rhode Island, $51.8 million has been spend since 1966. Both states have farmland protection programs which could potentially be used to retain important agricultural land in the valley. If these programs funds were applied to the Blackstone Valley, scenic farmlands would remain available for public appreciation, though not public access.

State programs could be more effective in valley revitalization if local officials and civic leaders had better information about them, and if the resources available from the state were better coordinated, both within and between the states. Rhode Island and Massachusetts have sponsored two interstate conferences on redevelopment of the Blackstone Valley, most recently in 1982. Such forums have been valuable in identifying areas for future interstate cooperation.

### 3. Federal Level

Although the federal government has a low profile in the valley, many revitalization projects are being supported by federal funds. Some federal programs are administered directly through regional offices in Boston, and some through state agencies in conformance with federal standards.

Some state policy makers concerned with the valley have suggested that it would be useful to inventory the federal programs and policies affecting the valley and find out if there are additional programs that could be better utilized in revitalization. They have also expressed interest in a "federal consistency" approach to the valley, whereby better coordination of local and state programs and policies would be paralleled by a deliberate effort to align federal program administration with valley revitalization.

### B. Local Support for Partnership Strategies

In a series of meetings and in many interviews, Blackstone Valley residents and their elected representatives expressed their belief that only tangible improvements, both economic and environmental, would sustain the momentum of present efforts at renewal. The preferred mechanism of renewal is independent, local action. However, this desire for locally-directed action is tempered by an appreciation of the regional and national trends that cannot be controlled by local will and action. Many of those interviewed watched the slow decline of the valley's textile-based economy over the last 50 years, despite all local efforts to prevent decline. Such bitter experience has led many long-time residents and community leaders to conclude that government assistance may be needed to spark a renaissance of the valley.

For example, residents and officials recognize the need for sizeable, long-term investments to eliminate the environmental hazards that have accumulated through industrialization and post-industrial neglect. If the Blackstone River is to be a public water supply with treatment, suitable for boating and swimming, it must be upgraded to Class B status, a task estimated to cost at least an additional $75 million in the form of sewage treatment facilities. Assuring safe disposal of solid waste is another environmental problem in the valley, and one that will require substantial sums to resolve. Locating and cleaning up hazardous waste sites is a third, large-scale task that exceeds local capabilities.

Generally speaking, valley residents seem accustomed to help from state agencies and expect little in the way of special attention from the federal government. This attitude may be simply a matter of familiarity; the federal government manages very little land in the valley, and federal laws and funds are increasingly administered through state agencies. However, most people interviewed would welcome federal assistance in long-term conservation and environmental improvement.

There is substantial support for some kind of federal recognition of the valley and interest in the National Heritage Corridor legislation for the Illinois and Michigan Canal. Similar recognition, it is felt, would both increase the valley's attractiveness to tourists and bolster its self-image thereby encouraging local efforts toward these ends.

Coordination of local, state and, in particular, interstate efforts is another federal role residents consider appropriate. There is some support for a federal role in mediating use conflicts in the river corridor. Balancing the development of the Blackstone River for hydropower and for public use and enjoyment has proved difficult in the past, as the Tupperware controversy shows. Applications for hydropower development of the river are growing in number. If such proposals are considered above all other uses, the river's considerable potential for recreation could be reduced.

Technical assistance in the areas of park management, resource interpretation, historic preservation and restoration is a third area where residents feel the federal government, through the National Park Service, could increase its involvement in the valley. Finally, there is a strong feeling that the significance of the Blackstone Valley in American history is undervalued and that the Park Service should take an active part in a program to research and interpret the history of the valley.

## C. Partnership Options

### Introduction

Three long-term conservation options for the Blackstone Valley are presented here. All rely on its wealth of natural and cultural resources as a lever in renewal. The first option assumes that present efforts would continue, succeed, and gradually expand under the leadership of local groups and the private sector. The second assumes a strengthened commitment to the valley from both states, particularly with respect to developing a linear park system along the Blackstone from Worcester to Providence. The federal response to this increased commitment could be the continued involvement of Park Service staff to assist the states in park planning and interpretation. The third option builds on the commitments and activities described in the first two. In response to an even higher level of state and local activity, the Department of the Interior could assist in the creation of a Blackstone Valley Heritage Commission and formally recognize the valley for its cultural, natural and recreational resources. While the federal role in this third scenario would be greater than in the other two, no federal land acquisition and direct management is proposed.

### 1. Option One

This option assumes that private groups and local and state governments concerned with the natural and cultural resources of the valley would continue and expand their efforts. No new state or federal commitments are assumed. Possible actions are as follows.

Protection of the Blackstone's headwaters and of ponds within the drainage basin could be improved by the formation of watershed associations for these water bodies. Water quality on the main stem of the Blackstone will continue to improve as the sewer separation project in Worcester is completed. If a closer relationship were developed between the Board of Health, the Regional Environmental Council and the watershed associations, this coalition could help the state DEQE and DPW in Massachusetts to enforce pollution regulations, to promote passage of local bond issues for needed sewage treatment facilities and to relocate dump sites from the corridor to safer, less valuable sites. In Rhode Island, organizations such as CANAL and watershed associations working with DEM could mount a similar effort.

As they continue to advise the states on park planning and design, the linear park and heritage park groups in both states could expand their role in promoting protection of land for public use and enjoyment. In Rhode Island, the park advisory group could organize a park constituency to campaign for passage of the $14 million Heritage Bond Issue in November, 1984, thereby assuring about $1 million for park construction. In Massachusetts, the Blackstone River and Canal Commission, local conservation commissions and the BWA could support the formation of a valley land trust to supplement state acquisitions for the Heritage Park and to preserve the opportunity for future public access to the river whenever this was jeopardized. The land trust could start by negotiating with the towns to transfer to the trust tax-delinquent properties along the Blackstone. The trust could later expand its efforts to include other lands valuable for wildlife or for active recreation. As towns in Massachusetts updated their master plans, singly or jointly, future requirements for recreation and open space could be assessed. Once these requirements were known, towns could apply for state matching funds to secure adequate lands and facilities for local recreation.

Local, regional and private organizations could also develop a base of support facilities for tourism and a strategy for attracting tourists to the Blackstone Valley. Through organizations such as the Blackstone Economic Development Council, the Providence and Worcester Railroad, the Council for Northeast Economic Action, Chambers of Commerce, environmental groups and universities, a tourism development study could be undertaken.

In this process the potential tourist market would be identified, and training workshops for residents interested in tourist enterprises would be conducted. Although local groups could lead and shape the effort, they would need some technical advice from both states' Departments of Commerce.

As part of their master plan updates, valley towns could examine their zoning and subdivision regulations to assure that these were up-to-date and consistent with master plan goals. Towns could also, in the process of planning, turn their attention to long-term maintenance of the scenic qualities of the landscape. In particular, ways of directing new development to existing settlements and of protecting farmland and farming could be examined. Identification of important landscapes could lead to protection of these by the valley land trust.

Historic commissions and societies could continue their present efforts and could work more closely, perhaps forming a regional historic group, to raise local awareness of the architectural and cultural heritage of the valley. Historic surveys of all the Massachusetts towns could be completed. Important buildings and districts could be nominated to the National Register of Historic Places. These structures would become attractive prospects for restoration, because owners or local developers could then take advantage of tax incentives under the federal Historic Preservation Act. Historic groups could sponsor workshops on the use of these tax incentives.

The historic features of the mill housing could be protected with flexible guidelines which would help keep the housing affordable. Chambers of Commerce, planning boards and historic groups could formulate strategies to help individuals and local groups apply for rehabilitation funds for blocks of mill housing.

Working with high schools and universities, historic groups could carry out a systematic effort to reveal the cultural heritage of the valley. Methods to foster this research include making small grants available for studies of ethnic groups and the life of mill towns, recording oral histories and sponsoring regional conferences. Coordination and promotion of the many town festivals that now take place could attract tourists to the area and promote local pride at the same time. As the cultural history is revealed, historic groups could collaborate on strategies for interpreting this history for residents and visitors.

### 2. Option Two

This option assumes that state commitments to the Blackstone Valley could be strengthened significantly. Expansion of local activities, as described in Option One, is also assumed. Specifically, the two states could commit themselves to connecting their linear park systems along the Blackstone River and to establishing a coordinated system for interpreting the valley's cultural history. The states could also channel appropriate funds and technical assistance towards the protection and upgrading of natural and cultural resources in the valley. The federal government could respond to these increased commitments from the local and state levels with continued assistance from the National Park Service related to planning, development and management of the linear park system and a coordinated interpretive system. Possible actions are as follows.

By Executive Order, the States of Massachusetts and Rhode Island could declare their intention to:

1. create an inter-state group to work with other relevant state agencies to survey and assess the effectiveness of state policies and programs for environmental management, community development and historic preservation for the purpose of revitalizing the Blackstone Valley;

2. complete linear park systems connecting Worcester and Providence; and

3. develop an interstate program for interpreting the cultural history of the valley.

By memorandum of agreement, NPS could provide technical assistance to the states in all areas of park development and management (design, resource interpretation, restoration of historic structures, visitor servicing) and in the planning and design of an interpretive system and signage to convey the valley's cultural history and significance. In addition, NPS staff could be available, on request, to help local governments with planning for appropriate development adjacent to the park.

As plans for the linear park in both states developed, Rhode Island and Massachusetts could choose to prepare a bi-state management plan. This could be followed by interstate cooperative agreements on park management and interpretation.

Realignments in state programs and policies affecting the valley could take place, pursuant to the state's assessment of these. DEQE in Massachusetts and DEM in Rhode Island could work closely with local, private and regional groups to upgrade the water quality of the Blackstone River and protect that of its tributaries. DEQE and DEM could also develop options for long-term disposal of solid waste and for relocation and improvement of dumps in the basin. State funds could be applied to cleaning up identified hazardous waste sites in the valley.

### 3. Option Three

This option assumes all the activities and commitments of Options One and Two. In addition, the states could commit themselves to work with local and private interests to formulate a heritage protection plan and strategy for the Blackstone Valley. This protection strategy could be ratified by the towns and cities in the valley. State legislation authorizing a matching grant program for implementation of the strategy could follow. These state and local actions could prompt a federal response in the form of legislation authorizing up to two years of technical assistance and matching funds for the development of a heritage resource plan and protection strategy. If valley towns within five years amended their plans, zoning ordinances and subdivision regulations to conform with the plan and protection strategy, the valley could be federally recognized and consistency of all federal programs affecting the valley could be mandated. Possible types of recognition could include: the National Register of Historic Places, National Recreation Trail or National Heritage Corridor.

The sequence of actions envisioned is as follows. In addition to the three actions listed in Option One, by Executive Order, the two states could declare their intention to participate with local governments and private interests to formulate a heritage resource plan and protection strategy and to implement this strategy.

Representatives could be chosen to form a temporary bi-state committee to develop a heritage resource plan and protection strategy for the valley. The National Park Service could participate in development of the plan. The plan and strategy would be specifically concerned with park and recreation areas, floodplains, farm and forest lands, fish and wildlife resources, culturally important town and village centers, and historic buildings and districts. The plan and strategy could also explore ways to improve public access to these resources and areas and to enhance the scenic qualities of the valley. Finally, the plan and strategy could be concerned with interpreting the cultural history of the valley.

After review and endorsement by the towns and cities, the heritage protection strategy could be ratified by the state legislatures which would also authorize a program of matching grants to local governments to help implement the strategy.

State legislation could be followed by federal legislation authorizing the National Park Service to help carry out the plan and protection strategy, and directing that all federal programs and policies be made consistent with the plan. The legislation could also authorize the Service to investigate the appropriateness and feasibility of affiliate status for National Historic Landmarks such as Slater's Mill which, by virtue of the regional strategy and linear parks, could potentially serve as interpretive centers for the valley.

Finally, federal legislation could provide for recognition of the resources of the Blackstone Valley, assuring local adoption of the Heritage Resource Plan and Protection Strategy. Under this concept, a bi-state commission could be established and supported under a cooperative public and private arrangement using a variety of existing and potential sources of revenue.

# APPENDICES

**Table 1.**

## BLACKSTONE VALLEY STATISTICS
## POPULATION TRENDS: 1940–1980

**Massachusetts towns (excluding Worcester)**

| | 1940 | 1950 | 1960 | 1970 | 1980 |
|---|---|---|---|---|---|
| Blackstone | 4,566 | 4,968 | 5,130 | 6,566 | 6,570 |
| Douglas | 2,617 | 2,624 | 2,559 | 2,947 | 3,730 |
| Grafton | 7,457 | 8,281 | 10,627 | 11,659 | 11,238 |
| Hopedale | 3,113 | 3,479 | 3,987 | 4,292 | 3,905 |
| Mendon | 1,315 | 1,619 | 2,068 | 2,524 | 3,108 |
| Millbury | 6,983 | 8,347 | 9,623 | 11,987 | 11,808 |
| Millville | 1,722 | 1,692 | 1,567 | 1,764 | 1,693 |
| Northbridge | 10,242 | 10,476 | 10,800 | 11,795 | 12,246 |
| Sutton | 2,749 | 3,102 | 3,638 | 4,590 | 5,855 |
| Upton | 2,249 | 2,656 | 3,127 | 3,484 | 3,886 |
| Uxbridge | 6,417 | 7,007 | 7,789 | 8,253 | 8,374 |
| Valley (MA) | 49,430 | 54,251 | 60,915 | 69,861 | 72,413 |
| | | | | | |
| Massachusetts | 4,316,721 | 4,690,514 | 5,148,578 | 5,689,170 | 5,737,037 |

**Rhode Island towns and cities (excluding Providence)**

| | | | | | |
|---|---|---|---|---|---|
| Central Falls | 25,248 | 23,550 | 19,858 | 18,716 | 16,995 |
| Cumberland | 10,625 | 12,842 | 18,792 | 26,605 | 27,069 |
| East Providence | 32,165 | 35,871 | 41,955 | 48,207 | 50,980 |
| Lincoln | 10,577 | 11,270 | 13,551 | 16,182 | 16,949 |
| North Smithfield | 4,196 | 5,726 | 7,632 | 9,349 | 9,972 |
| Pawtucket | 75,797 | 81,436 | 81,001 | 76,984 | 71,204 |
| Smithfield | 4,611 | 6,690 | 9,442 | 13,468 | 16,886 |
| Woonsocket | 49,303 | 50,211 | 47,080 | 46,820 | 45,914 |
| Valley (RI) | 212,522 | 227,596 | 239,311 | 256,331 | 255,969 |
| | | | | | |
| Rhode Island | 713,346 | 791,896 | 859,488 | 949,723 | 947,154 |
| | | | | | |
| Valley (subtotal w/o Worcester and Providence) | 261,952 | 281,847 | 300,226 | 326,192 | 328,382 |
| | | | | | |
| Worcester, MA | 193,694 | 203,486 | 186,587 | 176,572 | 161,799 |
| | | | | | |
| Providence, RI | 253,504 | 248,674 | 207,498 | 179,116 | 156,804 |
| | | | | | |
| Valley (total) | 709,150 | 734,007 | 694,311 | 681,880 | 646,985 |

Sources: U.S. Bureau of Census, 1961, 1981a, 1981b, CMRPD, 1983

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| Mendon | 1,315 | 1,619 | 2,068 | 2,524 | 3,108 |
| Millbury | 6,983 | 8,347 | 9,623 | 11,987 | 11,808 |
| Millville | 1,722 | 1,692 | 1,567 | 1,764 | 1,693 |
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|---|---|---|---|---|---|
| Central Falls | 25,248 | 23,550 | 19,858 | 18,716 | 16,995 |
| Cumberland | 10,625 | 12,842 | 18,792 | 26,605 | 27,069 |
| East Providence | 32,165 | 35,871 | 41,955 | 48,207 | 50,980 |
| Lincoln | 10,577 | 11,270 | 13,551 | 16,182 | 16,949 |
| North Smithfield | 4,196 | 5,726 | 7,632 | 9,349 | 9,972 |
| Pawtucket | 75,797 | 81,436 | 81,001 | 76,984 | 71,204 |
| Smithfield | 4,611 | 6,690 | 9,442 | 13,468 | 16,886 |
| Woonsocket | 49,303 | 50,211 | 47,080 | 46,820 | 45,914 |
| Valley (RI) | 212,522 | 227,596 | 239,311 | 256,331 | 255,969 |
| Rhode Island | 713,346 | 791,896 | 859,488 | 949,723 | 947,154 |
| Valley (subtotal w/o Worcester and Providence) | 261,952 | 281,847 | 300,226 | 326,192 | 328,382 |
| Worcester, MA | 193,694 | 203,486 | 186,587 | 176,572 | 161,799 |
| Providence, RI | 253,504 | 248,674 | 207,498 | 179,116 | 156,804 |
| Valley (total) | 709,150 | 734,007 | 694,311 | 681,880 | 646,985 |

Sources: U.S. Bureau of Census, 1961, 1981a, 1981b, CMRPD, 1983

**Table 2.**

## LAND USE IN THE BLACKSTONE VALLEY

**Massachusetts**

| | Area in Acres | |
|---|---|---|
| | 1951 | 1971 |
| Forest Land | 103,643 | 102,747 |
| Agriculture or Open Land | 36,512 | 21,184 |
| Wetlands | 7,963 | 7,416 |
| Mining, Waste Disposal | --- | 1,588 |
| Urban or Built-up Land | 17,763 | 31,226 |
| Outdoor Recreation | --- | 1,720 |
| TOTAL | 165,881 | 165,881 |

(67,132 ha.)

**Rhode Island**

| | | Area in Acres | |
|---|---|---|---|
| | 1961 | 1970 | 1975 |
| Agriculture | 5780 | 5540 | 2880 |
| Open Space | 8370 | 2910 | 6430 |
| Recreation | 3920 | 2160 | 2590 |
| Industrial | 2420 | 3420 | 3910 |
| Commercial | 1370 | 2690 | 2880 |
| Residential (higher density) | 21,180 | 14,820 | 14,760 |
| Residential (lower density) | | 8700 | 9410 |
| Transportation | 2950 | 3320 | 3960 |
| Open/Public Land | 1190 | 4440 | 4070 |
| Mining | 260 | 950 | 680 |
| Waste Disposal | 640 | 310 | 330 |
| Wetlands | 2980 | 1320 | 1870 |
| Forest | 46,370 | 44,720 | 41,090 |
| Water | - | 2720 | 2950 |
| Other | - | 0 | 210 |
| TOTAL | 97,430 | 98,020* | 98,020* |

(39,668 ha.)

* Differences due to changing interpretations (i.e. including water) and different measurement techniques.

**Table 2.**

## LAND USE IN THE BLACKSTONE VALLEY

### Massachusetts

| | Area in Acres | |
|---|---|---|
| | 1951 | 1971 |
| Forest Land | 103,643 | 102,747 |
| Agriculture or Open Land | 36,512 | 21,184 |
| Wetlands | 7,963 | 7,416 |
| Mining, Waste Disposal | --- | 1,588 |
| Urban or Built-up Land | 17,763 | 31,226 |
| Outdoor Recreation | --- | 1,720 |
| TOTAL | 165,881 | 165,881 |

(67,132 ha.)

### Rhode Island

| | | Area in Acres | |
|---|---|---|---|
| | 1961 | 1970 | 1975 |
| Agriculture | 5780 | 5540 | 2880 |
| Open Space | 8370 | 2910 | 6430 |
| Recreation | 3920 | 2160 | 2590 |
| Industrial | 2420 | 3420 | 3910 |
| Commercial | 1370 | 2690 | 2880 |
| Residential (higher density) | 21,180 | 14,820 | 14,760 |
| Residential (lower density) | | 8700 | 9410 |
| Transportation | 2950 | 3320 | 3960 |
| Open/Public Land | 1190 | 4440 | 4070 |
| Mining | 260 | 950 | 680 |
| Waste Disposal | 640 | 310 | 330 |
| Wetlands | 2980 | 1320 | 1870 |
| Forest | 46,370 | 44,720 | 41,090 |
| Water | - | 2720 | 2950 |
| Other | - | 0 | 210 |
| TOTAL | 97,430 | 98,020* | 98,020* |

(39,668 ha.)

* Differences due to changing interpretations (i.e. including water) and different measurement techniques.

## TABLE 3 SUMMARY OF
## CURRENT ZONING REGULATIONS OF TOWNS AND CITIES
## IN THE BLACKSTONE VALLEY

**Massachusetts**

| Towns and Cities | Date of First Adoption | Most Recent Admendment | Most Recent Revision Updating | (1) Site Plan Review | Historical or Heritage Zone | Flood Zone | Agricultural Zone | (2)Large-Lot Zone/ Rural Residential | Recreation/ Public Open Space Zone or Provision | Performance Standards | Environmental Review | Mobile Home Regulation | PUD or Cluster Development Provision | (6) Wetlands Regulations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Blackstone | 6/26/78 | 9/20/82 | 1/26/83 | X | | X | | | | X | | prohibited | X | |
| Douglas | 9/24/70 | 6/25/83 | 5/79 | X | | X | X | X | | | | permitted | | |
| Grafton | 3/20/74 | 6/8/83 | 5/14/80 | X | | X | | | | X | | prohibited | | |
| Hopedale | 6/11/73 | 4/2/84 | 1974 | | | X | | | X | | X | prohibited | X(4) | |
| Mendon | 5/27/70 | 5/7/82 | | | | X | | | | | | prohibited | | |
| Millbury (3) | 2/5/57 | 4/3/82 | 1983 | X | | X | | | | | X | prohibited | X | |
| Millville | 9/23/77 | | 9/23/77 | | | | | | | | | prohibited except for temporary cases | | |
| Northbridge | 11/67 | 5/23/83 | 3/19/81 | X | X | X | | | | | | prohibited | | |
| Sutton | 4/21/66 | 6/11/83 | 10/81 | X | | X | X | X | | | | prohibited except for temporary use with permit | | |
| Upton | | 6/28/82 | 1979 | X | | X | X | X | X | | | prohibited | | |
| Uxbridge | 10/24/57 | | 1/79 | | | X | X | | | | | prohibited | | |
| Worcester | 4/29/63 | | 4/29/80 | X(5) | | X | | | | | | | X | X |

**Rhode Island**

| Towns and Cities | Date of First Adoption | Most Recent Admendment | Most Recent Revision Updating | (1) Site Plan Review | Histor-ical or Heri-tage Zone | Flood Zone | Agricul-tural Zone | (2)Large -Lot Zone/ Rural Residen-tial | Recreation/ Public Open Space Zone or Provision | Perform-ance Stan-dards | Environ-mental Review | Mobile Home Regulation | PUD or Cluster Develop-ment Provision | (8) Wetlands Regulations. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Central Falls | 12/8/64 | 11/17/81 | 3/15/72 | | | X | | | X | | | prohibited | | |
| Cumberland | 1/14/53 | 1980 | 1979 | | | X | X | | | | | | | |
| East Providence | | | 1974 | | | X | | | X | | | permitted in one dist. | | |
| Lincoln | 6/14/48 | | 7/1/78 | | | X | X | | X | | | prohibited except by spec. use permit | | |
| North Smithfield | 9/1/73 | | 4/26/76 | | X(6) | X | X | X | | | | prohibited | X | X |
| Pawtucket | 10/21/66 | 10/11/83 | 4/83 | | | X | | | | | | prohibited except by spec. use permit | | |
| Providence | 10/21/51 | 2/10/84 | 11/79 | | X(6) | X | | | | | | | | |
| Smithfield | | | | | X(6) | X(7) | | | | | | | | |
| Woonsocket | 1923 | 4/18/83 | 4/83 | | X(6) | X | | | | | | prohibited except in emergency | | |

(1) In zoning ordinance, some towns require site-plan review as a part of the subdivision or building permit approval process.
(2) 2-acre minimum
(3) In the process of updating
(4) Planned townhouse development
(5) For PUD and in floodplain and wetlands zones
(6) The preservation of historic structures in North Smithfield, Providence, Smithfield and Woonsocket are governed by the Laws of Rhode Island, Title 45, Chapter 24.1

(7) Regulated through a separate Floodplain Management Ordinance.

(8) Wetlands in Rhode Island are regulated by DEM.

Sources: Derived from zoning ordinances of Massachusetts and Rhode Island towns and cities in the Blackstone Valley, the Central Massachusetts Regional Planning Agency, the Rhode Island Statewide Planning Program, and correspondence with several officials of individual towns and cities.

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